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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/866,021	05/23/2001	Boris I. Yakobson	5051-416DV	6193

20792 7590 03/07/2003

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EXAMINER

LISH, PETER J

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 03/07/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/866,021

Applicant(s)

YAKOBSON, BORIS I.

Examiner

Peter J Lish

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 24-25 and 28-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 24-25 and 28-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Applicant's arguments filed 2/5/03 have been fully considered but they are not persuasive. The applicant argues that the Charlier reference does not teach "an area of modified lattice structure positioned between the dipole" (the dipole being between the opposed and spaced apart pentagon-heptagon defects). However, the Charlier reference clearly teaches, as was noted in the previous action, paper #8, that these defects often lead to a connection of two cylindrical, straight portions with different physical structures (such as diameter and helicity) and electronic properties (such as metallic or semiconducting properties which are dependent upon the chiral vector or lattice structure). Additionally, the modified lattice structure is inherent to the area positioned between the opposed and spaced apart pentagon-heptagon defects.

The applicant also argues that the Charlier reference fails to teach the method by which applicant produces the claimed structure. Examiner notes that the structure being claimed is independent from the method by which it may be produced. The applicant furthermore argues that the Charlier reference teaches away from the claimed invention because it is concerned with eliminating 5/7 pair defects. Again, examiner notes that the structure being claimed is independent from the method by which it may be produced. Thus, while the Charlier reference may teach the elimination of such defects, this does not teach away from the existence of the structure.

Claim Rejections - 35 USC § 102

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 24-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Charlier et al. (“Structural and electronic properties of pentagon-heptagon pair defects in carbon nanotubes”).

The rejection of the previous action, paper #8, is maintained in its entirety and incorporated herein by reference.

Claims 28 and 31-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Charlier et al. (“Structural and electronic properties of pentagon-heptagon pair defects in carbon nanotubes”).

Charlier et al. is applied as in the previous action, paper #8. Charlier et al. additionally teach that the lattice structure is a hexagonal structure, see figure 1, that the nanotubes comprise carbon, and that the properties which may be modified are electronic properties.

Claims 29-30 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Charlier et al.

Charlier et al. is applied as in the previous office action, paper #8. Additionally, it is expected that the domain of modified lattice structure propagates in an imaginary spiral line between said defects, because the modified lattice structure is inherent to the opposed and spaced apart pentagon-heptagon defects. Alternatively, it would have been obvious to one of ordinary

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skill at the time of invention that the modified structure propagates between said defects, as the defects are the cause of the modified lattice structure.

It is also expected that the chirality vectors of Charlier et al. are (10, 10) in the normal (not modified) lattice structure and (10, 9) in the modified lattice structure. This is expected because the modified lattice structure is inherent to the opposed and spaced apart pentagon-heptagon defects. Alternatively, it would have been obvious to one of ordinary skill at the time of invention because the (10, 10) structure is the most common structure of carbon nanotubes, while the (10, 9) structure is the second most common, and additionally because they have different electronic properties.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Lish whose telephone number is 703-308-1772. The examiner can normally be reached on 9:00-6:00 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 703-308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-305-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

PL
March 3, 2003



STUART L. HENDRICKSON
PRIMARY EXAMINER